

Claims:

1. A process for the preparation of a silicon containing transition metal compound, said process comprising the steps of

(a) non-hydrolytic sol-gel condensation of a silane of formula



wherein L is a π -bonded ligand,
Q is an anionic ligand, and
 $x + n = 4$

10

with an halogenated silane (or siloxane) and an alkoxysilane,

(b) optionally alkylation,

(c) deprotonation, and

(d) addition of a transition metal compound.

15 2. A process according to claim 1 wherein L is a cyclopentadienyl, indenyl or fluorenyl ligand

3. A process according to claim 1 wherein x is 2 and Q is halogen.

4. A process according to claim 1 wherein the transition metal compound is a Group IVA metal halide.

20 5. A process according to claim 4 wherein the Group IVA metal is zirconium.

6. A process for the preparation of a silicon containing transition metal compound, said process comprising the steps of

(a) non-hydrolytic sol-gel condensation of a silane of formula



5 wherein L is a π -bonded ligand,
 Q is an anionic ligand, and
 $x + n = 4$

 with an halogenated silane (or siloxane) and an alkoxysilane,

(b) alkylation, and

10 (c) addition of a transition metal amine.

7. A process according to claim 6 wherein the transition metal amine is $Zr(NMe_2)_4$.

8. A polymerisation catalyst system comprising (a) a silicon containing transition metal compound prepared according to any of the preceding claims and (b) a cocatalyst.

9. A process for the polymerisation of olefin monomers selected from (a) ethylene,
 15 (b) propylene (c) mixtures of ethylene and propylene and (d) mixtures of (a), (b) or (c)
 with one or more other α -olefins, said process performed in the presence of a silicon
 containing transition metal compound prepared according to any of the preceding
 claims and (b) a cocatalyst.

10. A process for the polymerisation of ethylene or the copolymerisation of ethylene
 20 and α -olefins having from 3 to 10 carbon atoms, said process carried out in the presence
 of a (a) a silicon containing transition metal compound prepared according to any of the
 preceding claims and (b) a cocatalyst.

11. A process according to claims 9 or 10 wherein the cocatalyst is an aluminoxane.

12. A process according to claim 9 or 10 wherein the cocatalyst has the formula:



 wherein

L^* is a neutral Lewis base

30 $(L^*-H)_d^+$ is a Bronsted acid

A^{d-} is a non-coordinating compatible anion having a charge of d^- , and

 d is an integer from 1 to 3.

13. A process according to any of claims 9 to 12 carried out in the gas phase.